

misprints, the only one discovered being the omission of a " π " in the denominator of the expression for the absolute capacity of a condenser (p. 480). C. V. B.

MALAYAN ANTIQUITIES

Alterthümer aus dem Ostindischen Archipel und Angrenzenden Gebieten. Herausgegeben von Dr. A. B. Meyer. (Leipzig, 1884.)

THE present sumptuous volume forms the fourth of the series being issued under the enlightened management of the Curator of the Dresden Zoological and Anthropological Museum. These costly publications, which could scarcely be undertaken without the active co-operation of the general administration of the royal artistic and scientific collections in the Saxon Capital, will, when completed, prove a great boon, especially to students of eastern antiquities, and of the progress of human culture amongst the peoples of Southern Asia.

This fourth part, so far complete in itself, will be found of great value in elucidating the civilising influences both of Brahmanism and Buddhism on the races of Further India and the Malay Archipelago. It comprises nineteen photographic plates in folio, four of which are exquisitely coloured, with explanatory text and a map devoted almost exclusively to this important subject. Thus we have here embodied at once a descriptive and illustrated record of the archaeological treasures in the Dresden Collection, which serve to mark the progress of the arts in the Eastern Archipelago and neighbouring regions from the earliest historic period, that is, from the first contact of those lands with the Indian religious and artistic world.

The arrangement is thoroughly systematic and most convenient for purposes of reference and comparative study, objects in stone, metal, wood, porcelain, and allied materials being grouped separately, and dealt with in the order indicated. The four stone figures from Java, reproduced on the first two plates, show at once the advantage of this arrangement. Here we have on Plate I. a genuine Brahmanical Trimurti placed side by side with a full-breasted female figure of undoubted Buddhistic type; on Plate II. an unmistakable Brahmanical Siva, again contrasted with the representation in high relief of two men, who, from their devout attitude and other indications, are evidently of Buddhist origin. Taken collectively these two groups thus present a striking illustration of both streams of Hindu culture, by which the island of Java was successively flooded. On this point the Curator's remarks in the accompanying text are highly instructive:—

"The Hindu antiquities found in Java are either Brahmanistic, Buddhistic, or mixed. Brahmanism repeatedly occurs in its Sivaistic phase. Buddhism, pure only in Borobudur and Tyandi Mendut ('Veth,' Java, ii. 172), is found mixed with Sivaism, Sivaistic divinities sometimes surrounding images of Buddha (Leemans, 'Borobudur,' 444), Buddhistic figures at others encircling Sivaistic idols ('Veth,' ii. 103, 173), or else assuming monstrous forms, such as often characterise Brahmanical deities ('Veth,' ii. 96, and Max Uhle, 'Descriptive Catalogue in MS. of the Royal Ethnological Museum,' No. 1464)."

The greatest monuments of Buddhism appear to be concentrated mainly in the central parts of Java, while those of the Brahmanical cult are scattered round them in all directions. Extensive Brahmanical settlements had

already been formed in the island long before the first arrival of the Buddhist missionaries, who, according to Dr. Meyer, made their appearance probably about the fifth century of the new era. The stupendous Buddhist temple of Borobudur, rivalling that of Angkor-Vaht in Camboja, is assigned to the eighth or ninth century. But no attempt has been made to determine the date of the earliest Brahmanical remains in Java or the other islands of the Archipelago. They cannot, however, be much more recent than the first century of the Christian era, and may possibly be some two or three centuries earlier. It is to be regretted that this point cannot be determined with some approach to accuracy, for it has obviously a most important bearing on the question of the migrations of the Indonesian races, and especially on the diffusion of the Malayo-Polynesian languages throughout the Indian and Pacific Oceans. Those writers, who are disposed to regard these as comparatively recent events, should at least bear in mind that there are practically no traces of Sanskrit or Prakrit elements either in Malagasy, or in any of the Eastern Polynesian dialects. Hence, if Malaysia be taken as the point of dispersion west to Madagascar, east to the South Sea Islands, the migrations must necessarily have taken place at some time before the spread of Hindu influences throughout the Eastern Archipelago.

However, the collection is not confined to Hindu subjects, and on Plate VII. are figured a large number of iron spear-heads, some of which are undoubtedly subsequent to the introduction of Islām in the thirteenth century. Many of these objects, which were found in Jokjokarta (Java), are of simple type, much corroded by rust, and no doubt of considerable antiquity. But others show distinct traces of damaskeening, an art unknown before the arrival of the Arabs, although now universally diffused throughout the Archipelago. The process, locally known by the name of *pamor*, consists in manipulating steel and iron by means of acids, the designs being inlaid by the priests (Pfyffer, "Sketches from Java," p. 32).

Conspicuous among the bronze objects is a magnificent lion's head of absolutely unique type and great size (compass round neck 34 cm., diameter 30 cm., weight 100 kilograms), apparently from Camboja, although first discovered in Java. This superb bronze, whose analysis yielded copper 92.49, tin 5.53, lead 1.40, cobalt and nickel 0.07, iron 0.12, total 99.61, is referred by Dr. Meyer to the flourishing period of Cambojan art as embodied in the monuments of Angkor Vaht, and would accordingly be some 600 or 800 years old. Front and side views are here given in half the natural size on two separate plates. From these it is evident that the lion is playing the part of a rakshasa or guardian to some Buddhist shrine, such as are found sculptured at Borobudur. Another rakshasa of a very different character is a wooden figure of Garudha from the island of Bali, reproduced by the new phototype process, which has already rendered such valuable services to the arts, and especially to archaeology in Germany. Here Garudha is represented as a winged human figure bearing on his shoulders probably a Vishnu, of whom the legs alone, suspended in front, have been preserved. It is described as perhaps a Sivaitic representation from some Brahmanical temple in Bali, where Vishnuism and Sivaism are said to be intimately associated. The introduction of the Hindu cult into Bali, where it still holds its

ground in the midst of Islám, is referred to the beginning of the fifteenth century. But the fair state of preservation of this wooden image bespeaks a much more recent date.

On the concluding plates are figured numerous designs of bronze drums or gongs from every part of the Archipelago and Further India. These instruments, which play so large a part in the social economy of the Indonesian and Indo-Chinese peoples, are here brought together for the purpose of elucidating the obscure and hitherto little studied history of their origin and diffusion throughout South-Eastern Asia. Those interested in the subject will find much instructive matter embodied in the accompanying text.

A word of thanks is also due to Dr. Max Uhle, the Curator's able assistant, not only for his general co-operation, but more especially for the great care he has bestowed on the map of the regions in question. On it are accurately indicated all the places in Malaysia where Hindu antiquities have at any time been discovered, or where monuments dating from pre-Muhamadan times are found.

A. H. KEANE

OUR BOOK SHELF

The Antananarivo Annual and Madagascar Magazine, No. VIII. Christmas, 1884. (Antananarivo: Printed at the London Missionary Society's Press by Malagasy Printers.)

ALTHOUGH the previous number of this interesting periodical was, I believe, noticed in NATURE, I should like to call attention to the present issue, inasmuch as it is a token of the valuable scientific work which, amid great difficulties, is being bravely carried on by Christian missions in the sorely troubled island of Madagascar.

One of the editors of the *Annual*, the Rev. R. Baron, is an accomplished botanist, indefatigable in his efforts to explore the botany of his adopted home, and unwearied in his efforts to obtain materials for Mr. J. G. Baker and other workers at home; and his colleagues, no less than himself and his fellow editor, the Rev. J. Sibree, seem devoted to the double duty of teaching the Christian religion and civilisation to the Malagasy and of advancing our scientific knowledge of the strange land in which they are for the time being dwelling.

The present number, besides a spirited account of a Royal Kabary or coronation ceremony, contains valuable philological articles on the Malagasy pronouns, by the Rev. L. Dahle; on Malagasy dictionaries, by the Rev. W. E. Cousins; and on the want of new words in the Malagasy language and the way of supplying them, by the Rev. S. E. Jorgensen, the latter having a more than philological, indeed a personal, interest to scientific writers, who, like the Madagascar missionaries, are continually in "want of new words" and not always very judicious in their "way of supplying them." Articles on Malagasy superstitions, on the Sakaklava, and on Malagasy proverbs, contain much valuable matter for the anthropologist; while a paper on medical mission work, by a non-professional; an instructive critical exposure of a geographical fiction, by the Rev. L. Dahle; notes on natural history, by the Rev. R. Baron; a four years' record of rainfall, by the Rev. J. Richardson; and various notes, such as one recording the arrival, on Malagasy shores, of worn fragments of pumice-stone, supposed to be from Krakatoa, complete the number.

The technical printing does great credit to the native printers, for, though one German quotation has gone a little wrong, the press errors are otherwise exceedingly few.

I feel sure that I may bespeak the sympathy of the

readers of NATURE with the *Antananarivo Annual*, and that we may look forward with confidence to much scientific as well as other fruit from the continued labours of the editors and their confrères.

M. FOSTER

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

The Forms of Leaves

I HAVE read Mr. Henslow's letter with interest; and of course any criticisms from him are worthy of all attention. At the same time I may observe that as yet he has only seen what may be called an abstract of an abstract. A Friday evening lecture is scarcely the occasion to work out a special statement in detail; but he is apparently criticising not even my lecture itself, but merely an abstract of it. He commences by saying that it is "self-evident" that the size of the leaf is regulated mainly by the thickness of the stem. This may be, but, so far as I am aware, the importance of this consideration had not been previously pointed out. Having, however, first disposed of my statement as "self-evident," he proceeds next to deny it altogether, and quotes cases in which the size of certain leaves bore no reference to the thickness of the stem. With regard to these, however, I must observe that I was referring to leaf-area, and as Mr. Henslow does not mention the number of leaves his illustration is incomplete. Moreover, as he was dealing merely with an abstract of what I said, he does not recognise the qualifications to which, in the lecture itself, I called attention.

As regards holly leaves, Mr. Henslow denies my statement, and questions my explanation. With reference to the fact, I should have thought there was no question. It has been stated over and over again in standard works. Sir J. D. Hooker in the "Student's Flora," for instance, says that the leaves are spinous, adding, those on the upper branches often entire." This is entirely in accordance with my own experience. Next, as to the explanation. Mr. Henslow observes that it "seems to be attributing to the holly a very unexpected process of ratiocination." Surely, however, this would apply to any explanation, and in this world there must be some cause for everything. Mr. Henslow would not maintain that the pitchers of pitcher plants imply any process of ratiocination?

Mr. Henslow's next point is with reference to fleshy leaves, and he observes that, "Surely the usual explanation that it is this thick cuticle which prevents rapid exhalation is a better reason." A better reason for what? I was not speaking of the thickness of the cuticle but of the unusual development of the parenchymatous tissue.

Again, he questions whether "cut-up" leaves present a greater extent of surface in proportion to their mass, but surely he cannot seriously deny this.

Lastly, he doubts whether it is an advantage to water-ranunculi to have filiform leaves, because he saw a pond last summer which was dried up, and yet covered with a "carpet composed of the erect filiform branchlets of the cut-up leaves of *Ranunculus aquatilis*." But it does not follow that a plant placed in an abnormal situation should at once alter its habit, any more than an individual duck would lose its webbed feet because it was kept from water. Any one who will take an ordinary plant of *R. aquatilis* out of water will see at once that the leaves cannot support themselves.

I admit that my suggestions require more evidence than can be given in a single lecture, and I shall hope to develop them at greater length elsewhere; but in the mean time, though I think that Mr. Henslow's criticisms admit of answer, I am much obliged for his suggestions.

JOHN LUBBOCK

Aurora at Christiania

ON the evening of March 15 an aurora appeared of unusual proportions for our part of the country. It was seen for the first time at 7.45, and then consisted of diffused and faint arches high on the northern sky. By degrees its sphere extended, and